

Anomalous impurity absorption near ...

27257  
S/020/61/139/005/007/021  
B104/B201

(Optika i spektroskopiya, 2, 568 (1957); Dokl. na X soveshch. po spektroskopii, L'vov, iyul' 1956., Fiz. sborn. L'vovsk gos. univ., v. 3, 1, 140, 1957). A close examination of the spectra revealed that whenever an anomaly appeared in the intensity of the impurity bands, also the interval between the impurity absorption bands varied at the same time. It is inferred that the A-component of the Davidov doublet corresponds to a transition to the bottom of the A-band of the crystal. This allows the conclusion to be drawn on the strength of a well-known selection rule that the point  $\vec{k} = 0$  lies on the bottom of the A-band, and the effective mass of the exciton in this range is positive. There are 2 figures, 2 tables, and 9 references: 8 Soviet and 1 non-Soviet. The reference to English-language publications reads as follows: D. S. McClure, J. Chem. Phys., 24, 1668 (1954).

ASSOCIATION: Institut fiziki Akademii nauk USSR (Institute of Physics, Academy of Sciences UkrSSR)  
Institut poluprovodnikov Akademii nauk USSR (Institute of Semiconductors, Academy of Sciences UkrSSR)

Card 3/4

SHEKA, Ye.F.

Exciton luminescence of mixed crystals of naphthalene-Hg -  
naphthalene-Dg. Opt. i spektr. 12 no.1:137-140 Ja '62.  
(MIRA 15:2)

(Excitons)  
(Naphthalene crystals)

SHEKA, Ye.F.

Impurity exciton spectra of mixed crystals of isotopic forms of naphthalene. Izv.AN SSSR.Ser.fiz. 27 no.4:503-509 Ap '63.

(MIRA 16:4)

1. Institut fiziki AN UkrSSR.  
(Naphthalene crystals—Spectra)

L 10164-63 EPF(c)/EWT(1)/EWT(m)/BDS--AFFTC/  
ASD/SSD--Pr-4--RM/WW/MAY  
ACCESSION NR: AP3000308

S/0048/63/027/005/0596/0605

65  
63

AUTHOR: Broude, V. L.; Sheka, Ye. F.; Shpak, M. T.

TITLE: Exciton luminescence of molecular crystals [Report: Eleventh Conference  
on Luminescence held in Minsk 10-15 Sept. 1962]

SOURCE: Izvestiya AN SSR, Seriya fizicheskaya, v. 27, no. 5, 1963, 596-605

TOPIC TAGS: molecular crystals, naphthalene, excitons, energy bands,  
luminescence

ABSTRACT: Observation, interpretation and identification of exciton luminescence of molecular crystals is often difficult. Analysis of luminescence data for molecular crystals shows that in many cases the observed luminescence is not due to excitons, but to impurities or defects. The specific case of low temperature luminescence of naphthalene crystals is examined and attributions are made for the different luminescence bands. Exciton series are identified. The general energy structure of naphthalene crystals can be explained in the framework of a molecular diagram, but certain distinctive features of the

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L 10164-63

ACCESSION NR: AP3000308

2  
naphthalene luminescence spectrum are specifically associated with the exciton character of its crystal structure. It is hoped that the approach to analysis of these features may help elucidate the structure of the exciton bands (zones) in this crystal and can be extended to the study of other molecular crystals. Orig. art. has: 6 figures and 1 table.

ASSOCIATION: Institut fiziki Akademii nauk USSR (Institute of Physics, Academy of Sciences, USSR)

SUBMITTED: 00

DATE ACQ: 12Jun63

ENCL: 00

SUB CODE: PH

NR REF SOV: 013

OTHER: 007

*ellm/ak*  
Card 2/2

L 18740-63

EPF(c)/EWT(m)/EDS ASD Pr-4 RM/WW/MAY

ACCESSION NR: AT3002202

S/2941/63/001/000/0098/0102

AUTHORS: Broude, V. L.; Sheka, Ye. F.; Shpak, M. T.; Shpakovskaya, L. G. 61

TITLE: Luminescence of naphthalene crystals

SOURCE: Optika i spektroskopiya; sbornik statey. v. 1: Lyuminestsentsiya. Moscow, Izd-vo AN SSSR, 1963, 98-102

TOPIC TAGS: luminescence, electronic transition, spontaneous emission

ABSTRACT: Temperature dependence of luminescence in naphthalene crystals was studied, both in pure naphthalene samples and in 1-2% B-methylnaphthalene mixtures at 4.20 and 77K. Two types of luminescence bands are noticed: one strongly temperature-dependent, the other only moderately so. The authors maintain that the weak temperature dependence can be compared to electronic transitions between naphthalene impurity sublevels and the strong dependence with pure luminescence excitation zones. In addition, the spontaneous luminescence bands, associated with transitions from excitation zones into vibrationless levels of the ground state, are shown to be sharply polarized. Orig. art. has: 3 figures.

Card 1/2

SHEKA, Ye.F.

Some quantitative regularities of the Rashba effect in impurity crystals. Fiz. tver. tela 5 no.8:2361-2364 Ag '63. (MIRA 16:9)

1. Institut fiziki AN UkrSSR, Kiyev.  
(Naphthalene crystals--Spectra)

ACCESSION NR: AP4042980

S/0051/64/017/001/0051/0056

AUTHOR: Sheka, Ye. F.

TITLE: Comparative investigations of spectral properties of deuteroderivatives of naphthalene

SOURCE: Optika i spektroskopiya, v. 17, no. 1, 1964, 51-56

TOPIC TAGS: naphthalene, hexane, deuterated compound, single crystal, absorption spectrum, molecular luminescence, luminescence spectrum, electron transition

ABSTRACT: In view of the little attention paid hitherto to the substances in the homological series of deuteriosubstitutes of naphthalene, the author presents data obtained at 20K on the molecular luminescence spectra of four members of this series ( $\alpha$ -d<sub>1</sub>,  $\alpha$ -d<sub>4</sub>,  $\beta$ -d<sub>4</sub>, and d<sub>8</sub>) frozen in n-hexane and on the absorption spectra of

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ACCESSION NR: AP4042980

single crystals of these substances. The spectra were compared with the absorption and luminescence spectra of natural naphthalene, which have recently been re-analyzed in detail (V. L. Broude, Opt. i spektr. Sb. No. 2, Molekulyarnaya spektroskopiya, 49, 1963; V. L. Broude et al. Opt. i spektr. sb. No. 1, Lyuminestsentsiya, 102, 1963; Izv. AN SSSR ser. fiz. v. 27, 596, 1963). The comparison of the spectra was limited to an examination of the general principles of their construction and to a qualitative comparison of the properties of individual bands. The spectral region analyzed covered the first electronic transition. Inasmuch as the spectral shift following even complete substitution of the hydrogen atoms with deuterium is  $115\text{ cm}^{-1}$ , which is less than any characteristic distance in the spectrum of the naphthalene crystal, it is concluded that the spectral properties of the compounds of the investigated homological series are practically identical. Orig. art. has: 2 figures and 1 table.

2/3

ACCESSION NR: AP4042980

ASSOCIATION: None

SUBMITTED: 12Aug63

SUB CODE: OP, OC

NR REF SOV: 015

ENCL: 00

OTHER: 002

3/3

*Journal of Management Inquiry* 18(6)

1. The first part of the report, "Introduction", discusses the importance of the study and the objectives of the research.

L 3342-66 ENT(1)/ENT(m)/ENP(j) IJP(c) RM

ACCESSION NR: AP5017304

UR/0181/65/007/007/2094/2097

AUTHORS: Broude, V. L.; Vlasenko, A. I.; Rashba, E. I.; Sheka, Ye. F.

TITLE: Electron-vibrational luminescence of impurity centers of large radius

SOURCE: Fizika tverdogo tela, v. 7, no. 7, 1965, 2094-2097

TOPIC TAGS: luminescence spectrum, impurity center, impurity level, vibration spectrum, deuterium compound

ABSTRACT: This is a continuation of earlier work (FTT v. 5, 2361, 1963 and preceding papers) on impurity absorption in molecular crystals. In the present investigation the authors studied the spectra of electron-vibrational luminescence from impurity levels lying near the exciton bands. It is shown that in such states, the excitation in the molecular crystals is not localized entirely on the impurity molecule, but encompasses also near-lying host molecules, so that the electron-vibrational luminescence spectrum contains simultaneously bands corresponding to transitions to the vibrational levels of both

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L 3342-66

ACCESSION NR: AP5017304

the impurity molecules and the host. It is shown that the ratio of the intensities of these bands determines directly the square of the amplitude of the excitation of the impurity molecule in the initial state and in addition is closely related with the parameters of the purely electronic absorption spectrum. The excitation amplitudes of the impurity molecules are calculated approximately for  $C_{10}H_8$  dissolved in  $C_{10}D_8$ ,  $\beta-C_{10}H_7D$ , and  $\beta-C_{10}H_4D_4$ , as well as for  $\alpha-C_{10}H_7D$  and  $\beta-C_{10}H_7D$  dissolved in  $C_{10}D_8$ . Orig. art. has: 1 figure, 2 formulas and 1 table.

ASSOCIATION: Institut fiziki AN UkrSSR, Kiev (Institute of Physics AN UkrSSR)

SUBMITTED: 03Feb65

ENCL: 00

SUB CODE: SS, OP

NR REF SOV: 006

OTHER: 002

Card 2/2

L 45862-66 EWT(1)/EEC(k)-2/T/EWP(k) IJP(c) WG/GD

ACC NR, AT6015141

SOURCE CODE: UR/0000/66/000/000/0188/0213

AUTHOR: Broude, V. L.; Sheka, Ye. F.

ORG: Institute of Physics, AN UkrSSR (Institut fiziki AN UkrSSR)

TITLE: Luminescence on an intense excitation

SOURCE: Respublikanskiy seminar po kvantovoy elektronike. Kvantovaya elektronika (Quantum electronics); trudy seminara. Kiev, Naukova dumka, 1966, 188-213

TOPIC TAGS: luminescence, luminescent crystal, luminescence center, laser theory

ABSTRACT: The kinetic equations used by V. S. Mashkevich ("Kinetic basis of laser radiation," Naukova dumka publishers, Kiev, 1966) are employed, in the present article, for deducing the laws of luminescence intensity and spectral distribution in a system (a crystal) receiving high-power excitation. Under stationary conditions in a homogeneous system, the radiation spectral distribution depends on these three factors: (1) Addition of induced transitions, (2) Population of the final level that takes part in a transition, (3) Geometric structure of the luminescent system. Mode distribution of photons depending on the number of excited centers and the exciting-

Cord 1/2

L 45862-66

ACC NR: AT6015141

light intensity is analyzed. A simultaneous exciton and extrinsic luminescence, when the induced radiation transitions are not the only cause of possible redistribution of intensity in the luminescence spectrum, is examined. The above theory is used in calculating exciton-luminescence of molecular crystals (anthracene). The effect of pumping on spectral distribution is found by using an experimental exciton-luminescence spectrum of anthracene measured at 77K. Both exciton and extrinsic luminescences of high-power excited anthracene crystals were experimentally studied. Such crystals appear promising in the development of multifrequency lasers. 15  
 "The cryostat was developed by V. S. Medvedev at the Institute of Physics, AN UkrSSR. A student of the Kiev State University, N. S. Belokrimitskiy, took part in the investigation ...." Orig. art. has: 13 figures, 72 formulas, and 2 tables.

SUB CODE: 20 / SUBM DATE: 12Feb66 / ORIG REF: 013 / OTH REF: 002

Card 2/2 ULR

L 27749-66 EMT(1)/T IJP(c) GG  
ACC NR: AP6018699

SOURCE CODE: UR/0386/66/003/011/0429/0434

AUTHOR: Broude, V. I.; Rashba, E. I.; Sheka, Ye. F.

ORG: Institute of Physics, Academy of Sciences Ukrainian SSR (Institut fiziki Akademii nauk Ukrainskoy SSR) 48  
B

TITLE: Collective effects in vibron spectra of molecular crystals

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 11, 1966, 429-434

TOPIC TAGS: light absorption, absorption spectrum, electron transition, naphthalene, paraffin wax, deuterium, vibration spectrum, particle interaction, exciton

ABSTRACT: To check on a hypothesis recently advanced by one of the authors (Rashba, ZhETF v. 50, 1164, 1966) that two-particle absorption plays an important role in the interpretation of electron-vibrational (vibron) transitions in the absorption spectra of molecular crystals, the authors measured the absorption spectra of pure and deuterated naphthalene and paraffin in the region of the first vibron transition and confirmed the presence of a two-particle band in the spectrum which is shifted to the long-wave side relative to the maximum of the state density of the pure-electronic exciton band. The experiments also disclosed the presence of two additional vibron bands corresponding to vibrational excitation at the impurity molecule and in its vicinity. These agree well with Rashba's hypothesis and confirm the strong influence of collective effects (decay processes) on the vibron spectrum and

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ACC NR: AP6018699

the presence in this spectrum of two branches corresponding to single- and two-particle absorption. The latter is estimated to reach 50% of the total vibron transition. It is proposed that the two-particle absorption can play an important role in the interpretation of the known structure background of the absorption of molecular crystals and the determination, from this interpretation, of many new parameters of exciton bands. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 30Mar66/ ORIG REF: 010/ OTH REF: 001

Card 2/2 *10*

SHEKA, Z. A.

3

\ Electrochemical extraction of bromine from bromine-containing waters. Ya. A. Palykov and Z. A. Sheka, *Zapiski Inst. Khim., Akad. Nauk Ukr. R. S. S. R.*, No. 2, 85-98 (in Russian 99-100, in English, 100-1)(1946).—The bromine-contg. water is electrolyzed until considerable excess of hypochlorite is formed. The chloridized water is mixed with natural water in the mixer and thus the excess of hypochlorite in soln. is used to transform the bromide of the water to hypobromite. The latter is then acidified and the free Br is subsequently recovered by conventional means. The method seems to possess possibilities of com. application.

M. O. Holowaty

L.A.

6

Refractometric study of complex compounds of aluminum bromide with halides of alkali metals in benzene. Z. A. Sheka and I. A. Sheka (Acad. Sci. Ukrain. S.S.R., Kiev) *Zhur. Fiz. Khim.* 23, 1275-80 (1949).—The mol. refraction  $R$  was calcd. from  $n$  detd. at 20° for Na light.  $R$  was independent of concn. (approx. 3-30%).  $R$  for  $AlBr_3$  was 32.12, whereas  $R$  calcd. for  $Al^{+++} + 3 Br^{-}$  was 15. For homopolar bonds,  $R$  is calcd. to be 26.  $R$  for  $LiCl \cdot AlBr_3$ ,  $NaCl \cdot AlBr_3$ , and  $KCl \cdot AlBr_3$  was 70.15, 70.50, and 72.23, about 3 less than  $R$  calcd. from the additivity rule; and  $R$  of  $LiBr \cdot AlBr_3$ ,  $NaBr \cdot AlBr_3$ , and  $KBr \cdot AlBr_3$  was 73.03, 73.17, and 75.15, about 4 less than calcd. Presumably the halogens of the binary salt form homopolar bonds with  $AlBr_3$ . J. J. Bikerman

Sheka, Z. A.

structure of solutions, etc

Compounds of alkali metal halides with aluminum bromide.  
 I. A. Sheka and Z. A. Sheka (C.R. Acad. Sci. U.R.S.S., 1949, 89, 197-200). The mol. refraction of the systems  $MX-AlBr_3 \cdot C_6H_6$  (M is Li, Na, or K; X is Cl or Br) is < that calculated from the additivity rule by an amount equal to the difference between at. and ionic halogen. Electrolytic studies suggest formation of the anions  $AlBr_4^-$  and  $Al_2Br_7^-$ . The dipole moments of the compounds  $MX \cdot Al_2Br_7$  (M is Li, Na, K, Cs, or Rb) in  $C_6H_6$  are very close to those of  $MX$  alone. This conforms with the view that  $MX$  is linked to  $AlBr_3$  by homopolar forces; the same applies to  $IBr \cdot Al_2Br_7$  in  $CS_2$ .  
 B. Tauscor.

Sheka, Z. A.

# U S S R .

✓ Transfer of ions in solutions of bromides of aluminum and sodium in ethyl bromide. Z. A. Sheka, I. A. Sheka, and R. I. Pechenava, *Ukrain. Khim. Zh.* 337-47 (1960) (in Russian); cf. C.A. 48, 6790h. — The investigation was made on solns. contg. from 7.7 to 13.7%  $AlBr_3$  and varying amts. of NaBr according to the ratio mole NaBr/mole  $AlBr_3$  = 0.2 to 0.9. Following the electrolytic disson. the concns. of individual components were detd. analytically, Al as  $Al_2O_3$ , Na as  $Na_2SO_4$ , and Br by the Volhard method. The results showed that at the ratio  $R$  = mole NaBr/mole  $AlBr_3$  < 0.5 the only potential was 2.1 volts, which corresponded to the deposition potential of Al. At ratio  $R$  = 0.6 to 0.9 two potentials were measured, 2.1 and 4.0 volts, which correspond to the deposition potential of Al and Na, resp. At the ratio  $R$  = 1.0 only one deposition potential of 4.0 volts was established, which is that of Na. At low ratios of NaBr/ $AlBr_3$ ,  $Al^{+++}$ ,  $C_2H_5Br$  ions, and at high ratios the ions of Na, predominate; anions  $AlBr_4^-$  and  $Al_2Br_7^-$  are in equilibrium. Transport of Al to the anode of the system NaBr- $AlBr_3$ - $C_2H_5Br$  differs from other similar systems in the amt. of the transported Al and in its dependency on the ratio NaBr/ $AlBr_3$ .  
M. O. Holowaty

6

C A

The compound between aluminum bromide and ethyl bromide. I. A. Shkly and Z. A. Shkly, Inst. Gen. Inorg. Chem. Acad. Sci. U.S.S.R., Moscow. *Doklady Akad. Nauk S.S.R.* 73, 740-42 (1980). —The deviation  $\Delta\epsilon$  of the exptl. dielec. const. of mixts. of  $\text{AlBr}_3$  with  $\text{EtBr}$  at 20°, in soln. in  $\text{CS}_2$  of const. total concn.  $\text{AlBr}_3 + \text{EtBr} = 0.427 M$ , and with the proportion of each component varying from 0 to 100%, from the dielec. const. calcd. by the additivity rule, passes through a max. at the mol. ratio  $\text{AlBr}_3:\text{EtBr} = 1$ . The deviation  $\Delta P$  of the exptl. polarization from that calcd. from additivity has also a max. at that ratio. The max. is relatively flat. The plot of  $\epsilon$  against the mol. ratio  $\text{EtBr}:\text{AlBr}_3$  at the const. mol. ratio  $\text{AlBr}_3/\text{CS}_2 = 0.0137$ , consists of 2 rectilinear portions of different slopes with a break at  $\text{EtBr}:\text{AlBr}_3 = 1$ . This proves the existence of a relatively little stable compd.  $\text{AlBr}_3:\text{EtBr}$  in soln. S. Thon

SHEKA, L.A.

Transport of ions in solutions of aluminum bromide in ethyl bromide. Z. A. Shcka, L. A. Shcka, and E. Pechenaya. *Ukrain. Khim. Zhur.* 17, 911-17(1951); ~~ibid.~~ *ibid.* 16, 337(1950).—During an investigation of the Friedel-Crafts reaction the migration no.  $M$  of each of the ions in the  $AlBr_3$ -EtBr system was observed in a transference cell ( $C$ );  $M$  was the ratio of the net change in the no. of equivs. of Al (or Br) in either compartment of  $C$  to the no. of faradays passed through  $C$ . Values of  $M$  for anionic Al and Br were 2.00 and 2.12, resp. In dil. solns. (about 5%) of  $AlCl_3$  in  $PhNO_2$ ,  $AlBr_3$  in  $MeCN$ , and  $AlBr_3$  in  $MeNO_2$  the values of  $M$  for anionic Al and Br in that order were 1.3 and 1.9, 0.8 and 1.3, and 0.6 and 1.3, resp. The  $AlBr_3$ -EtBr system contains the compd.  $AlBr_3 \cdot C_2H_5Br$  and such complex ions as  $Al(C_2H_5Br)_3^{+++}$  and  $(AlBr_4)^-$  or  $(Al_2Br_7)^-$ .  
J. W. Loweberg, Jr.

10-13-54 M.E.F.

Shel'n, z.n.

USSR

✓ Composition of ions in solutions of halide compounds of aluminum and their complex compounds. ~~A. A. Shkva~~  
*Raboty Khim. Rastvorov i Kompleks. Soedinenii. Akad. Nauk Ukr. S.S.R.* 1954, 113-31.---A review with 30 references, dealing mainly with work done in U.S.S.R. on the chemistry of Al halide solns. to 1953. The following cation-anion combinations are found in the various systems: fused KBr-AlBr<sub>3</sub>: K<sup>+</sup> and Al<sub>2</sub>Br<sub>7</sub><sup>-</sup>; fused NaCl-AlCl<sub>3</sub>: Na<sup>+</sup> and AlCl<sub>4</sub><sup>-</sup> or AlCl<sub>6</sub><sup>3-</sup>; AlCl<sub>3</sub>-PhNO<sub>2</sub>: solvated Al ions and AlCl<sub>4</sub><sup>-</sup>; AlBr<sub>3</sub>-EtBr: solvated Al ions, AlBr<sub>4</sub><sup>-</sup>, and Al<sub>2</sub>Br<sub>7</sub><sup>-</sup>; AlBr<sub>3</sub>-PhNO<sub>2</sub>: solvated Al ions, Br<sup>-</sup>, AlBr<sub>4</sub><sup>-</sup>, and Al<sub>2</sub>Br<sub>7</sub><sup>-</sup>; KBr-AlBr<sub>3</sub>-C<sub>6</sub>H<sub>6</sub>: [K<sub>2</sub>AlBr<sub>6</sub>]<sup>+</sup> and Al<sub>2</sub>Br<sub>7</sub><sup>-</sup>; KBr-AlBr<sub>3</sub>-PhNO<sub>2</sub>: (K<sup>+</sup>, solvated Al ions, Al<sub>2</sub>Br<sub>7</sub><sup>-</sup> and AlBr<sub>4</sub><sup>-</sup>; NaBr-AlBr<sub>3</sub>-EtBr: Na<sup>+</sup>, solvated Al ions, AlBr<sub>4</sub><sup>-</sup>, and Al<sub>2</sub>Br<sub>7</sub><sup>-</sup>.  
 V. M. Kosolapoff



USSR/Chemistry - Inorganic chemistry

Card 1/1 Pub. 116 - 2/24

Authors : Sheka, Z. A., and Pechenaya, E. I.

Title : About the composition of ions of thallium trichloride in methyl alcohol and acetonitrile

Periodical : Ukr. khim. zhur. 21/2, 149-151, 1955

Abstract : The migration of thallium trichloride ions was investigated in acetonitrile and methyl alcohol to determine the electrolytic dissociation of the thallium trichloride into  $TlCl_2^+$  and  $Cl^-$ . It was found that Tl and Cl in thallium trichloride solution in the presence of acetonitrile and methyl alcohol migrate toward the anode which indicated a complex anion of the  $TlCl_4^-$  composition. The cathode deposits obtained during electrolysis of these solutions were found to contain metallic Tl and chloride and trichloride Tl which were probably formed during the discharge of the  $Tl^+$ ,  $TlCl_2^+$  and  $TlCl_4^+$  cations. Three references; 2 USSR and 1 USA (1926-1954). Tables.

Institution : Acad. of Sc., Ukr. SSR, Inst. of Gen. and Inorgan. Chem. Lab. of Complex Compounds

Submitted : July 3, 1954

SHEKA, Z.A.

Conference on the use of tracers in the chemistry of complex  
compounds. Zhur.neorg.khim. 1 no.2:345-348 F '56. (MLRA 9:10)

(Radioactive tracers) (Compounds, Complex)

SHEKA, Z.A.; KRISS, Ye.Ye.

Study of the formation of cobaltic xanthogenate. Zhur.neorg.  
khim. 1 no.3:586-597 Mr '56. (MLRA 9:10)

1. Laboratoriya khimii kompleksnykh soyedineniy Instituta  
obshchey i neorganicheskoy khimii Akademii nauk URSS.  
(Cobalt xanthates)

Sheka, Z. A.

Complex formation in aqueous solutions of sulfuric acid  
(and some metal sulfates). Ya. A. Fialkov and Z. A. Sheka,  
Zhur. Neorg. Khim. 1, 1238-42 (1956).—Aq. solns. of  $\text{CoSO}_4 \cdot \text{H}_2\text{SO}_4$ ,  $\text{NiSO}_4 \cdot \text{H}_2\text{SO}_4$ ,  $\text{CuSO}_4 \cdot \text{H}_2\text{SO}_4$ , and  $\text{ZnSO}_4 \cdot \text{H}_2\text{SO}_4$ , at 0.25 to 0.5 g. mol./l. exhibit deviations in elec. cond. from that expected, assuming additivity. The deviations are always in the direction of reduced cond., indicating complex formation. The suggested complex  $\text{M}(\text{SO}_4)_2^{--}$  (where M is the metal) has an apparent dissocn. const. (to metal and sulfate ions) of 0.02-0.03 in all cases. In the aq. system  $\text{ZnSO}_4\text{-CoSO}_4$  only slight complex formation is observed.  
C. H. Fuchsman

2

4  
0  
0  
0

MM  
LH

INST. Gen. Inorganic Chem, Acad. Sci USSR  
Lab. Complex Compounds

SHUKA, Z.A.

Separation of antimony during the electrodeposition of zinc.  
Ukr.khim.zhur.22 no.3:387-393 '56. (MIRA 9:9)

1. Institut obschey i neorganicheskoy khimii AN USSR.  
(Antimony) (Zinc plating)

SHEKA, Z.A.

Separation of cobalt during electrolysis of zinc solutions. Ukr.khim.  
zhur.22 no.3:394-400 '56. (MIRA 9:9)

1. Institut obshchey i neorganicheskoy khimii AN USSR.  
(Zinc---Electrometallurgy) (Cobalt)

Sheka, Z. A.

Stability of zinc cathodic deposits in electrolytes: Z. A. Sheka and L. A. Kotarlenko. *Ukrain. Khim. Zhur.* 22, 6 661-6 (1958) (in Russian). The rate of soln. of Zn deposits increases with the concns. of Co and  $H_2SO_4$  in the soln. and especially with the Co concn. in the deposit. The presence of glue and Sb in the electrolyte with Co greatly reduces the amt. of corrosion, probably by altering the structure of the deposit.

John Howe Scott

SHEKA, Z.A.; KRISS, Ye.Ye.

Role of copper ions in the removal of copper from zinc solutions  
using the xanthate method. TSvet.met. 29 no.11:43-47 N '56.

(MLRA 10:1)

(Zinc--Metallurgy) (Xanthic acid) (Cobalt)



Sheka, Z.A.

19  
Radioactive isotopes in the study of the behavior of  
impurities in the zinc sulfate electrolyte. Z. A. Sheka and  
K. F. Kuriysheva. Prot. Acad. Sci. U.S.S.R., Sect. Chem.  
Technol. 108, 49-52(1958)(English translation).—See C.A.  
51, 3328g. B. M. R.

pm  
mt  
am  
ja

2.  
484  
1-amp  
1-jwm

SHENKA, Z. A.

The use of radioactive isotopes in the study of the behavior of impurities in the zinc sulfate electrolyte. Z. A. Shenka and K. F. Karlysheva. *Doklady Akad. Nauk S.S.S.R.* 108, 126 (1958). The effects of metallic impurities upon electrolysis were studied by adding these impurities tagged with radioactive isotopes to the  $ZnSO_4$  electrolyte, contg. 60 g./l. Zn and 100 g./l.  $H_2SO_4$ , at a c.d. of 400 amp./sq. m. and at 20°. The coprecipitation of Co, Fe, Cd, Cu, Sb, As, In, and Ge was stud. from changes in the soln. radioactivity, and all these metals were found to be codeposited with Zn in the approx. proportion in which they were present in the soln. Increasing the  $H_2SO_4$  concn. decreases the Co codeposition, has no effect on Sb and As codeposition, and increases the Ge codeposition. At higher temps. more Co and Ge are deposited and the Sb content is not affected. The codeposition kinetics are interesting in that Sb and Co are deposited more intensively at first. The addn. of glue or gelatine actually increases somewhat the Co and Sb codeposition. The effect of Mn on the codeposition of metals, if present as the only other impurity in the electrolyte, was of especial interest. Under Zn deposition conditions, hydrated  $MnO_2$  is deposited on the anode and collects as a sludge at the bottom. The combination of the largely developed surface, strong oxidizing power, and high adsorptive capacity result in 3-6% of Se, Sb, and Sn present being eliminated from the electrolyte with the sludge, and 0.2% As. Up to 23% In and 12% Ge become collected in the sludge. Cu, Cd, and In are largely codeposited with Zn (7-14%), while most of the Co, Fe, Cd, and Cu remain in the electrolyte. The formation of  $SbH_3$  depends on the amount of Sb in soln., and on the Zn current yield, and may reach 4-7% of Sb deposited.  $SbH_3$  formation can be detected with 0.1 mg.  $Sb/l.$ , at c.d. of 400 amp./sq. m. The addition of glue to the electrolyte prevents the  $SbH_3$  formation.

W. M. Sternberg

Inst. Gen. & Inorg. Chem.  
AS Ukr SSR

SHUKA, Z.A.; KRISS, Ye.Ye.

Determining the solubility of xanthogenates of certain heavy metals.  
Zhur. neorg. khim. 2 no.12:2819-2823 D '57. (MIRA 11:2)

1. Institut obshchey i neorganicheskoy khimii AN USSR, Kiev.  
(Solubility) (Xanthic acids)

SOV/136-58-10-11/27

AUTHORS: Sheka, Z.A. and Kriss, Ye. Ye.

TITLE: Reaction of Cobalt Salts with Potassium Xanthates  
(Vzaimodeystviye soley kobal'ta s ksantogenatom kaliya)

PERIODICAL: Tsvetnyye Metally, 1958, Nr 10, pp 53 - 55 (USSR)

ABSTRACT: The authors comment on the views of I.A. Kakovskiy (Tsvetnyye Metally, 1958, Nr 7) on the processes occurring during the removal of cobalt from zinc-electrolysis solutions with the aid of potassium xanthate. They maintain that the method used by Kakovskiy to study the composition and properties of xanthates of various metals is not applicable to cobalt xanthate: their more careful repetition of Kakovskiy's experiments showed (table) that the reaction of soluble cobalt salts with potassium xanthate is not the simple exchange assumed by Kakovskiy. They indicate that this author contradicted himself and based his conclusions on erroneous experimentation which also distorted his thermo-dynamic treatment of the subject. The authors refer to their own work (Refs 4, 9) which showed that copper can advantageously be replaced by their oxidising agents, in particular, hydrogen peroxide as used at the Elektrotsink Works; they do not

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SOV/136-58-10-11/27

Reaction of Cobalt Salts with Potassium Xanthates

admit Kakovskiy's criticism of their views on the role of  
copper in the precipitation of cobalt.  
There are 1 table and 12 references, 5 of which are  
Soviet, 4 English, 1 French, 1 Italian and 1 German.

Card 2/2

FLAKOV, Ya. A. and SHERA, Z. A. (Kiev)

"The Phenomenon of Association as One of the Formation Factors of Electrolytic Non-Aqueous Solutions."

Report presented at Conference on the Effect of ESolvents on the Properties of Electrolytes, Khar'kov, 14-16 Oct '57.

Zhurnal Fizicheskoy Khimii, 1958, Vol 32, Nr 4, pp 960-962.

5(1,4)

RUSSIAN BOOK ABSTRACTS

387/3413

Akademiya nauk Ukrainy SSR. Institut khimicheskoy i neorganicheskoy khimii

Raboty po khimii rastvorov i kompleksnykh soedineniy, v. 2  
(Fascicles on the Chemistry of Solutions and Complex Compounds,  
Pt. 2) Kiev, 1959. 229 p. Errata slip inserted, 2,000  
copies printed.

Resp. Ed.: Ya.A. Piatkov (Deceased) Corresponding Member,  
Ukrainian SSR, Academy of Sciences; Ed. of Publishing House:  
Z.S. Pokrovskaya; Tech. Ed.: M.I. Yefimova.

PURPOSE: This book is intended for research scientists, teachers in  
schools of higher education and technical schools, aspirants, and  
students of advanced chemistry courses.

COVERAGE: The collection contains 9 articles which review work  
conducted at the Institute for General and Inorganic Chemistry,  
Ukrainian Academy of Sciences, on electrolytic aqueous and  
nonaqueous solutions, the chemistry of complex compounds,

Piatkov, Ya.A. and Yu.P. Mazarsky. Study of Inorganic Halides on the Basis of Isotope Exchange Reactions	116
Sheka, I.A., and Ye.Ye. Kriss. Metal Xanthates	135
Sheka, I.A. Physicochemical Analysis of Solutions on the Basis of Dielectric Properties	163
Babko, A.K., and T.Ye. Goltzman. Spectrophotometric Study of Complexes of Low Stability During Complex Formation	186
Babko, A.K., and T.M. Nazarchuk. Study of Metal Compounds Dyed With Oxanthroquinones	199
Markov, B.F. Electromotive Forces of Chemical Bonds With Individual Fused Slats	216

AVAILABLE: Library of Congress

Card 3/3

TR/mas  
3-30-60

SHEKA, Z.A.; KRISS, Ye.Ye.

Metal xanthogenates. Rab.po khim.rastv.i kompl.soed. no.2:  
135-162 '59. (MIRA 13:4)

(Xanthic acids)



5(2)

SOV/78-4-2-33/40

AUTHORS: Fialkov, Ya. A. (Deceased), Sheka, Z. A., Kriss, Ye. Ye.

TITLE: On Cobalt Xanthogenate (O ksantogenate kobal'ta)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 2,  
pp 472-477 (USSR)

ABSTRACT: The interaction of potassium xanthogenate with cobalt sulfate in aqueous solutions, depending on the pH of the solution, was investigated. The transformation was determined by physico-chemical and chemical analyses. Upon the interaction in a slightly alkaline medium a precipitate is formed which can be extracted by benzene. The formula of cobalt xanthogenate, re-crystallized from benzene, is  $\text{Co}(\text{C}_2\text{H}_5\text{OCS}_2)_3$ . After extraction of cobalt xanthogenate a black residue remains which is insoluble in benzene and other organic solvents. The analysis of the residue showed ~34% cobalt and ~18% sulfur. The black residue is a mixture of several compounds which are formed upon the interaction of cobalt ions with decomposition products of potassium xanthogenate. The interaction of the aqueous solutions of potassium xanthogenate with cobalt sulfate is not a simple

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SOV/78-4-2-33/40

On Cobalt Xanthogenate

exchange reaction but is accompanied by secondary reactions. The optical density of the system cobalt sulfate - potassium xanthogenate was determined. At the same time the formation of the compound  $\text{Co}(\text{C}_2\text{H}_5\text{OCS}_2)_3$  was determined. Xanthogenate decomposes quickly in acid solutions, at the same time the optical density decreases without the formation of a maximum of the curve composition - optical density. The decomposition velocity of xanthogenate rises with the increase of the concentration of the acid and the increase of the duration of the interaction of the components. The results show that physico-chemical analyses of the system potassium-xanthogenate-cobalt salts in aqueous solutions give no satisfactory results because of secondary reactions. There are 3 figures, 2 tables, and 15 references, 8 of which are Soviet.

SUBMITTED: December 12, 1957

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5(2)

AUTHORS:

Sheka, Z. A., Kriss, Ye. Ye.

SOV/78-4-8-17/43

TITLE:

On Compounds of the Chlorides of Lanthanum and Cerium With Ethyl Alcohol and Ketones (O soyedineniyakh khloridov lantana i tseriya s etilovym spirtom i ketonami)

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 8, pp 1809-1813 (USSR)

ABSTRACT:

No data are available in publications on the complex compounds of  $CeCl_3$  with ethyl alcohol. For the lanthanum complex  $LaCl_3 \cdot 2C_2H_5OH$  is mentioned in reference 6. Since  $NdCl_3$  which has similar properties as  $LaCl_3$  forms the complex  $NdCl_3 \cdot 3C_2H_5OH$ , the same was also assumed for the lanthanum and cerium complexes. These complexes were produced for test purposes. Table 1 shows that their composition is  $LaCl_3 \cdot 3C_2H_5OH$  and  $CeCl_3 \cdot 3C_2H_5OH$ . These compounds are little stable and separate from alcohol already at room temperature and at longer standing. Table 2 shows the solubility of the chlorides of lanthanum and cerium in ketones. The solubility was determined

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On Compounds of the Chlorides of Lanthanum and  
Cerium With Ethyl Alcohol and Ketones

SOV/78-4-8-17/43

by means of radioactive isotopes. The examination of the complex formation was carried out by measuring the dielectric constant. The results for the system  $\text{LaCl}_3 - (\text{CH}_3)_2\text{O}$  are shown in table 3 and figure 1. The reaction with other ketones is shown by figure 2 and table 4. One or two alcohol molecules of the solvate shell were substituted in the complexes  $\text{LaCl}_3 \cdot 3\text{C}_2\text{H}_5\text{OH}$  according to the chemical activity of the ketones. Benzoin and acetophenone react most energetically.  $\text{CeCl}_3$  reacts with ketones weaker than lanthanum salts. The energy of the ketones is not sufficient to substitute all three alcohol molecules. With pyridine (Fig 3, Table 5), however, compounds with a ratio  $\text{LaCl}_3 : \text{Py} = 1 : 2.7$  could be determined which approximately corresponds to the composition  $\text{LaCl}_3 \cdot 3\text{Py}$ .

The determination of the dielectric constant made possible a comparative qualitative characteristics of the complex compounds. There are 3 figures, 5 tables, and 9 references, 3 of which are Soviet.

SUBMITTED:  
Card 2/2

May 27, 1958

5(2)

AUTHORS:

Sheka, Z.A., Kriss, Ye. Ye.

05865

SOV/78-4-11-18/50

TITLE:

On the Interaction Between Nitric Acid and Tributyl Phosphate

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 11,  
pp 2505 - 2510 (USSR)

ABSTRACT:

The tributyl phosphate (TBPh) used for the extraction of lanthanides and actinides forms compounds when interacting with nitric acid which have been investigated by several authors (Refs 1-6), among them V.V. Fomin and Ye.P. Mayorova (Ref 5) who detected the formation of  $\text{HNO}_3 \cdot \text{TBPh}$  and  $2\text{HNO}_3 \cdot \text{TBPh}$ . This complex formation has hitherto been investigated primarily on the basis of the distribution of nitric acid among the aqueous and nonaqueous phase. The authors studied the complex formation directly in the non-aqueous phase by measuring the dielectric constant of a solution of  $\text{HNO}_3$  - TBPh in carbon tetrachloride (Table 1). They measured isomolar series of  $\text{HNO}_3$ -TBPh and series with varied additions of  $\text{HNO}_3$ . Data indicate the formation of the

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05865

SOV/78-4-11-19/50

On the Interaction Between Nitric Acid and  
Tributyl Phosphate

compounds  $\text{HNO}_3 \cdot \text{TBPh}$  and  $3\text{HNO}_3 \cdot \text{TBPh}$ , furthermore another compound  $n\text{HNO}_3 \cdot \text{TBPh}$  with  $n > 3$  which could not be detected under the present experimental conditions. The formation constants for  $\text{HNO}_3 \cdot \text{TBPh}$  and  $3\text{HNO}_3 \cdot \text{TBPh}$  were calculated according to the distribution of  $\text{HNO}_3$  among the aqueous and the nonaqueous phase (Table 3). Comparison of the experimental distribution curve of  $\text{HNO}_3$  with that calculated for the two complexes (Fig 3) shows that the first complex compound predominates at concentrations of up to 4 moles/l of  $\text{HNO}_3$  in water approximately, while the second one is formed not before higher concentrations (at 9 moles/l of  $\text{HNO}_3$  approximately) have been attained. Beyond the latter value, non-chemical dissolution of nitric acid takes place in the non-aqueous phase besides the formation of a still higher complex compound. There are 3 figures, 3 tables, and 14 references, 10 of which are Soviet.

SUBMITTED:  
Card 2/2

July 24, 1958

5(2)

AUTHOR:

Sheka, Z. A.

05896

SOV/78-4-11-49/50

TITLE:

8th All-Union Conference on the Chemistry of Complex Compounds

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 11,  
pp 2647-2654 (USSR)

ABSTRACT:

This Conference took place in Kiev in May 1959, and was attended by about 600 chemists, also from Czechoslovakia and Poland. President was I. I. Chernyayev. V. I. Spitsyn opened the Conference with a report on the tasks of chemical research within the Seven-year Plan. Totally 97 reports were delivered. A. K. Babko (Kiev = K): Investigation of Complex Formation in Solutions of Ternary Systems; M. M. Tananayko (K) dealt with the same subject. Complexes with ethylene diamine tetraacetic acid were discussed by: G. S. Savchenko, I. V. Tananayeva, Ye. V. Goncharova (Moscow = M); B. P. Nikol'skiy, A. M. Trofimov, N. B. Vysokoostrovskaya (Leningrad = L); L. I. Martynenko, A. I. Kameneva (M). Complex Formation in Inorganic Redox Systems: V. P. Nikol'skiy, V. V. Pal'chevskiy, R. G. Gorbunova (L). I. Koryta (Prague): Velocity of Formation of Cyclic Compounds. I. V. Pyatnitskiy (K): Dependence of Stability on Radius and Charge of the Cation.

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Complex Compounds

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SOV/78-4-11-49/50

A. V. Pavlinova, A. Ya. Protsenko (Chernovtsy): Al- and Zn-Compounds With Oxyacids. Ya. D. Fridman (Frunze): Equilibrium in Solutions of Mixed Compounds of Cu, Ag, Hg, Pb, Cd, Sb, Bi. A. A. VIšek (Prague): Polarographic Investigation of Complex Compounds. P. K. Migal', N. Kh. Grinberg (Kishinev): Aquo Complexes of Metal Ions. The application of chromatography was dealt with by: D. I. Ryabchikov, A. N. Yermakov, V. K. Belyayeva, I. N. Marova (M); Z. A. Sheka, Ye. Ye. Kriss (K); R. M. Dranitskaya, A. A. Morozov, Ye. K. Tsuguy, A. I. Gavril'chenko (Odessa); B. N. Laskorin (M); B. I. Nabivanets (K). Physical investigation methods by: M. Ye. Dyatkina (M), K. B. Yatsimirskiy (Ivanovo), V. I. Belova, Ya. K. Syrkin (M); V. N. Tolmachev, L. N. Serpukhova, G. G. Lomakina (Khar'kov); G. V. Boki, M. N. Lyashenko, V. I. Sokol (M). Complex compounds of Co, Ni, Cu, Pt of type  $MeA_2X_2$  were dealt with by: M. A. Poray-Koshits, G. N. Tishchenko, L. O. Atovmyan (M). M. I. Usanovich (Alma-Ata) reported on Complex Formation in the System  $H_2SO_4 - HNO_3 - CH_3COOH - H_2O$ . IR-spectra of the complexes of unsaturated organic compounds containing O, N, S with  $AlCl_3$ ,  $AlBr_3$ ,  $SnCl_4$ ,  $TiCl_4$  were dealt with by

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8th All-Union Conference on the Chemistry of  
Complex Compounds

D. S. Bystrov, V. N. Filimonov, A. N. Terenin (L); complexes in nonaqueous media: Ya. A. Fialkov, Z. A. Fokina (K), T. N. Sumarokova, E. Sh. Yarmukhamedova, I. G. Litvyak (Alma-Ata). Thermochemistry of aquo- and solvo complexes: V. P. Vasil'yev (Ivanovo), L. L. Shevchenko (K), A. M. Golub, L. I. Romanenko, V. M. Samoylenko (K). Complexes of the Pt-group: I. I. Chernyayev, L. A. Nazarova, V. S. Orlova (M), A. A. Grinberg, A. I. Dobroborskaya, A. I. Stetsenko (L), A. D. Troitskaya (Kazan'), Kh. I. Gil'dengershel' (L), L. M. Vol'shteyn (Dnepropetrovsk), A. V. Babayeva, O. N. Yevstaf'yeva (M), S. V. Bukhovets (L), B. S. Batsanov, Ye. D. Ruchkin (Novosibirsk), A. A. Babushkin, L. A. Gribov, A. D. Gel'man (M), I. I. Chernyayev, A. G. Mayorova, N. K. Pshenitsyn, S. I. Ginzburg, L. G. Sal'skaya, O. Ye. Zvyagintsev, S. M. Starostin (M). Cobalt complexes were dealt with by: A. V. Ablov, A. Ya. Sychev (Kishinev), V. A. Golovnya, L. A. Kokh, A. V. Babayeva, I. B. Baranovskiy (M), P. V. Gogorishvili, M. G. Karkarashvili, M. G. Tskitishvili (Tbilisi), A. N. Sergeyeva, K. N. Mikhalevich (L'vov), I. B. Khakham, I. M. Reybel', N. I. Lobanov, O. S. Konovalenko (Kishinev). Complexes of nonferrous metals: Jan Gažo (Bratislava), V. V. Udovenko, M. V. Artemenko (K), G. A. Popovich, A. V. Ablov (Kishinev), I. L. Kukhtevich (Dnepropetrovsk). Complexes of individual metals and nonmetals were discussed by:

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Complex Compounds

M. N. Orlova, K. B. Yatsimirskiy (Ivanovo) - Au; B. V. Ptitsyn,  
L. I. Vinogradova, L. L. Getskina (L) - citrates; A. V. Novoselova,  
K. N. Semenenko, N. Ya. Turova, A. I. Grigor'yev (M) - Be;  
L. P. Adamovich, I. I. Timofeyeva, B. V. Yutsis (Khar'kov) -  
aurintricarboxylic acid; S. N. Avakyan (Yerevan), M. S. Novakovskiy,  
M. G. Mushkina (Khar'kov) - Cd; G. Vanags, E. Gudriniece,  
A. Ievins (Riga) - aryl-azo- $\beta$ -diketones. Boron complexes:  
I. G. Ryss (Dnepropetrovsk), V. I. Mikheyeva, V. Yu. Markina (M).  
B. Jeżowska-Trzebiatowska, J. Danowska, L. Pajdowski (Wrocław)  
spoke about rhenium- and vanadium complexes. F. Ya. Kul'ba,  
V. Ye. Mironov (L), A. M. Zharnovskiy (Odessa) - Ti; V. P. Toropova  
(Kazan') - Hg-, Ag-, Cd- and Ni-semicarbazides. V. G. Tronev,  
G. K. Babeshkina, A. S. Kotelnikova, Miao ch'ing-shen (M) - Re;  
V. A. Nazarenko (Odessa) - Ge; rare earths were dealt with by  
Ya. A. Fialkov (report delivered by Yu. Ya. Fialkov) V. I.  
Yermolenko, N. V. Aksel'rud, S. I. Yakubson, N. A. Kostromina (K);  
V. A. Golovnya, L. A. Pospelova (M); L. A. Alekseyenko, V. V.  
Serebrennikov (Tomsk); N. Ye. Brezhneva, V. I. Levin, M. G. Panova (M);  
L. S. Serdyuk, G. P. Fedorova (Dnepropetrovsk); O. A. Osipov,  
Yu. B. Kletenik (Rostov-na-Donu), I. A. Sheka, K. F. Karlysheva,  
L. I. Dubovenko (K).

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8th All-Union Conference on the Chemistry of  
Complex Compounds

05886  
SOV/78-4-11-49/50

A. I. Volkova, T. Ye. Get'man: Titanium salicylates. Uranyl compounds: I. I. Chernyayev et al. (M), A. A. Lipovskiy, S. A. Nikitina, V. V. Vdovenko, D. N. Suglovov (L). M. P. Mefod'yeva (M): Neptunyl complexes. V. A. Golovnya, G. T. Bolotova (M) :  
U<sup>IV</sup> and Ce. I. V. Tananayev, Lu Chao-ta (M) - thorium.  
Heterocompounds were dealt with by: V. I. Spitsyn, A. A. Babushkin, G. V. Yukhnovich, I. D. Kolli, Ye. A. Torchenko, G. G. Stepanova (M); A. K. Babko, Yu. F. Shkaravskiy (K), Ye. Ya. Rode, M. M. Ivanova, Ye. A. Nikitina, N. A. Tsvetkova (M). A. A. Grinberg reported on the Conference on Coordination Chemistry, London, April 1959. -  
The following resolutions were passed: Intensified investigation of complexes with technically important properties (semiconductor, catalysts), as well as of complexes for military and medical purposes; application of new physical investigation methods (paramagnetic resonance, neutronography, radiation effect, etc); application of wave mechanics to the theory of chemical binding. The Otdel khimicheskikh nauk AN SSSR (Department of Chemical Sciences of the AS USSR) is requested to give preference to the problem of "Production, Investigation of the Structure, Properties and Application of Complex Compounds", and to establish a council for the planning and coordination of these

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8th All-Union Conference on the Chemistry of  
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SOV/78-4-11-49/50

investigations. The next conference on complex chemistry is to take place in 1962. Conferences on part problems are to be held in the meantime on a small scale. The publication of monographs, reference and collective books including translations and photostatic copies, is desirable. A permanent attendance of Soviet scientists at international conferences, and participation in their organization, are absolutely necessary.

Card 6/6

S/078/60/005/012/013/016  
B017/B064

AUTHORS: Kriss, Ye. Ye., Sheka, Z. A.

TITLE: Extraction of Rare Earth Elements With Di- and Tributyl Phosphate

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 12, pp. 2819-2823

TEXT: The distribution coefficients of nitrates of lanthanum, neodymium, yttrium, and ytterbium were determined in extractions with n-dibutyl phosphate and tributyl phosphate in dependence on the nitric acid concentration and the concentration of rare earths, and compared. Extractions were carried out at 20-21°C in a shaking funnel for 25-30 minutes. Carbon tetrachloride was used as solvent for di- and tributyl phosphate. The rare earth content in the aqueous and organic phases was determined by means of radioactive analyses with the isotopes La<sup>140</sup>, Nd<sup>147</sup>, Y<sup>91</sup>, Ho<sup>166</sup>, and Yb<sup>175</sup>. The distribution coefficients were found to decrease in the extraction with dibutyl phosphate when the nitric acid concentration and the concentration of nitrates of rare earths increased in the aqueous phase, ✓

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Extraction of Rare Earth Elements With Di-  
and Tributyl Phosphate

S/078/60/005/012/013/016  
B017/B064

whereas in the extraction with tributyl phosphate, when the concentration of nitrates of rare earths increased, the distribution coefficients were found to increase. Separation of rare earths at low acidity of the solution is easier when tributyl phosphate is used. Tables give a good survey of the results obtained. Table 1 gives the results of the nitrate extractions of some rare earths and of yttrium with one-molar solutions of tributyl phosphate and n-dibutyl phosphate in  $\text{CCl}_4$  in dependence on the nitric acid concentration. Tables 2 and 3 show the distribution coefficients of nitrates of rare earths in solutions of tributyl phosphate and n-dibutyl phosphate in  $\text{CCl}_4$  in dependence on the concentration of the lanthanide nitrates  $\text{Ln}(\text{NO}_3)_3$ . To compare the efficiency of extractions, Table 4 shows the results of nitrate extractions of some rare earths with di- and tributyl phosphate, and with dioctyl phosphate. The varying effect of the nitric acid concentration upon the extraction of rare earths with dibutyl phosphate and tributyl phosphate is probably due to different stabilities of complex compounds of nitrates of rare earths with dibutyl phosphate and tributyl phosphate. The complex compounds of rare earths with dibutyl phosphate are assumed to be decomposable at higher nitric acid concentrations, whereas the complex compounds of rare earths with

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Extraction of Rare Earth Elements With Di-  
and Tributyl Phosphate

S/078/60/005/012/013/016  
B017/B064

tributyl phosphate are also stable at higher nitric acid concentrations.  
A. A. Sorokina is mentioned. There are 4 tables and 29 references; 14  
Soviet, 11 US, 3 British, 1 Danish, 1 French, and 1 Italian.

SUBMITTED: July 9, 1959

Card 3/3

SHEKA, Z.A.; KRISS, Ye.Ye.; KHEYFETS, I.M.

Removal of cobalt impurities from zinc solutions by the xanthogenate method with the use of hydrogen peroxide. Ukr. khim. zhur. 26 no.5:658-662 '60. (MIRA 13:11)

1. Institut obshchey i neorganicheskoy khimii AN USSR.  
(Zinc) (Cobalt) (Xanthic acid)



SHEKA, Z.A.; KHEYFETS, I.M.; KOTORLENKO, I.A.

Treatment of cobalt xanthogenate cakes. Ukr. khim. zhur. 26 no.6:  
776-780 '60. (MIRA 14:1)

1. Institut obshchey i neorganicheskoy khimii AN USSR.  
(Cobalt compounds) (Xanthic acid)

SHEKA, Z.A.; KRISS, Ye.Ye.

Complexing in the systems containing rare earth nitrates and tri-  
or dibutyl phosphate. Zhur.neorg.khim. 6 no.8:1930-1935 Apr '61.  
(MIRA 14:8)

(Rare earth nitrate) (Butyl phosphate)

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1087

24055  
S/020/61/138/004/014/023  
B103/B203

AUTHORS: Kriss, Ye. Ye. and Sheka, Z. A.

TITLE: Interaction of some rare earths with dibutyl phosphate and their separation by extraction

PERIODICAL: Akademiya nauk SSSR. Doklady. v. 138, no. 4, 1961, 846-849

TEXT: The authors studied the complexes formed in the interaction of ions of rare earths with acid dibutyl phosphate  $(C_4H_9O)_2HPO_2$  (HDBP), determined their instability constants, and separated some pairs of rare earths by this method. On the basis of published data they concluded that dialkyl phosphates  $(R_2HPO_4)(R = \text{alkyl radical})$ , particularly HDBP, are superior to tributyl phosphate for such a separation. The distribution coefficients ( $q_m$ ) for extraction with HDBP decrease with increasing concentration of nitrates of rare earths. With the use of  $R_2HPO_4$ , the separation coefficient of adjacent lanthanides varies between 1.95 (light lanthanides) and 2.6 (heavy ones), whereas it lies between 1 and 2 with tributyl phosphate.

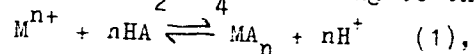
Card 1/5

24053

S/020/61/138/004/014/023  
B103/B203

Interaction of some rare earths with ...

Metal ions react with  $R_2HPO_4$  according to the scheme



where HA is a monobasic acid, in this case HDBP. The value of n is determined as tangent of the angle of inclination of the curve  $\log q_m$ ;  $\log [HDBP]$ , and denotes the number of HDBP molecules interacting with the metal ions.  $q_m = [M]_{org}/[M]_{water}$ . n = 3 was found for neodymium and praseodymium. DBP is dimerized in nonpolar solvents:  $M[H(DBF)_2]_3$ . The authors used the following methods: (1) fractional extraction of the metal from aqueous solutions by HDBP solutions in  $CCl_4$ ; (2) isolation of the compounds and their chemical analysis; (3) determination of the solubility of individual compounds in HDBP solutions in  $CCl_4$ , and of the distribution of rare earths between the aqueous and the non-aqueous phase. Ad (1): The authors found that the entire yttrium was extracted by the non-aqueous phase when reaching the ratio  $\frac{HDBP (g-mole)}{Y (g-at)}$ . Hence, they conclude that

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24053

S/020/61/138/004/014/023

B103/B203

Interaction of some rare earths with ...

the resulting compound  $M(DBP)_3$  is not solvated unless there is an HDBP excess. Ad (2): Some solid neodymium and ytterbium compounds were prepared by mixing solutions of the corresponding nitrates with HDBP or its alcoholic solution. In a dry state, they also had the composition  $M(DBP)_3$ . These experiments did not confirm the formation of complex compounds of rare earths with a ratio of molecule numbers higher than 1:3. Ad (3) The authors studied the solubility of  $M(DBP)_3$  in HDBP solutions in  $CCl_4$  with the use of radioactive  $Yb^{175}$ . They found that the solubility of  $Yb(DBP)_3$  increased with increasing HDBP concentration. This suggests the interaction  $Yb(DBP)_3 + n(HDBP)_2 \rightleftharpoons Yb[H(DBP)_2]_3$  (2). They calculated the equilibrium constant of the complex formation and determined the number of HDBP molecules entering reaction (2). Hence, they conclude that a compound  $Yb(DBP)_3 \cdot 3HDBP$  or  $Yb[H(DBP)_2]_3$  is formed with an excess of complex former. They measured the molecular electrical conductivity of the saturated solution of  $Nd(DBP)_3$  ( $6.2 \cdot 10^{-4}$  moles/l) at  $20^\circ C$ ; it was 235.5.

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24053

S/020/61/138/004/014/023

B103/B203

Interaction of some rare earths with ...

This suggests a strong dissociation of the complexes of rare earths with DBP. Considering this, the authors derive the equation for the equilibrium constant  $\log K = \log q_m - 3 \log [A^-] - 3 \log [HA]$  (7). Besides, they determined the values of  $\log K$  for the complexes of praseodymium, neodymium, and ytterbium of the type  $M_3H(DBP)_3$ ; they were 15.0, 15.3, and 18.5, respectively. The great difference in the stability of complexes between yttrium and cerium elements in the extraction with HDBP may be utilized for their separation. The separation coefficients depend on the position of elements in the lanthanide group, the content of  $HNO_3$  in the aqueous phase, the HDBP concentration in the non-aqueous phase, and the quantitative ratio of the elements to be separated in their mixture. The coefficient varies between 1.9 and 2.4 for the pair Nd--Ho. In the re-extraction of elements from the non-aqueous phase, an additional separation may be attained by utilizing the different stability of complexes with HDBP. Thus, cerium elements are precipitated by oxalic acid, and additionally separated from the yttrium elements. The latter can be precipitated by NaOH from the solution in HDBP. There are 2 tables and 17 references: 3 Soviet-bloc and 14 non-Soviet-bloc. The 3 references to

Card 4/5

SECRET  
The following information is being released to the public  
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Assassination Records Collection Act of 1992 (JFKARCA).  
This information is being released to the public in accordance  
with the provisions of the JFKARCA.

S/186/62/004/003/010/022  
E075/E436

AUTHORS: Kriss, Ye.Ye., Sheka, Z.A.

TITLE: Complex compounds of lanthanide nitrates with nitric acid

PERIODICAL: Radiokhimiya, v.4, no.3, 1962, 312-322

TEXT: Interaction between certain lanthanide nitrates and nitric acid was studied by the electromigration method and absorption by ion exchanger, in view of the widespread application of the systems for the extractive isolation and separation of lanthanides. Results of the electromigration studies show that in solutions with a high concentration of nitric acid the stability of anionic complexes decreases with the increasing atomic number of the elements, whilst the stability of the cationic complexes increases, although their absolute concentration in the solutions is negligible. The stability of neutral complexes increases markedly with the atomic number. Results of ion-exchange on anionite ЭДЭ-10П (EDE-10P) confirm that the stability of anionic nitrate complexes of the rare earth elements decreases in the order  $\text{La} > \text{Pr} > \text{Nd} > \text{Sm} > \text{Dy} > \text{Yb}$ . It was found that anionic

Card 1/2



Complex compounds of lanthanide ...

S/186/62/004/003/010/022  
E075/E436

complex  $\text{La}(\text{NO}_3)_3 - \text{HNO}_3$  forms in 7N  $\text{HNO}_3$ . For  $\text{HNO}_3$  concentrations up to 1 to 1.5 M, cationic lanthanide predominates; for 3 to 4 M  $\text{HNO}_3$  neutral complexes predominate; at higher concentrations of  $\text{HNO}_3$  (up to 7 M), elements of the Ce group form anionic complexes and elements of the Yb group remain in the form of neutral complexes. Constants for the formation of cationic complexes were determined in order to evaluate distribution of a metal between cationic and electrically neutral forms. This work was carried out with cation exchanger KY-2 (KU-2) in its hydrogen form and calculation made using the method of S. Fronaeus. From the results obtained it was inferred that the high concentration of  $\text{HNO}_3$  in the solutions favours extraction of the lanthanides with tributylphosphate. The heavy elements are extracted with larger distribution coefficients than the light elements. At the high solution acidity there is a difference between the composition of the heavy and light metal ions, the former forming electrically neutral complexes and the latter anionic complexes. Apparently the neutral complexes can form  $\text{M}(\text{NO}_3)_3 \cdot 3\text{TBF}$ , in which form the lanthanides are extracted. There are 6 figures and 12 tables.

SUBMITTED: April 20, 1961  
Card 2/2

S/078/62/007/003/014/019  
B110/B138

18 1295  
AUTHORS: Sheka, Z. A., Kriss, Ye. Ye.

TITLE: Compounds of rare-earth elements with dibutyl phosphoric acid

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 7, no. 3, 1962, 658 - 664

TEXT: Compounds resulting from the synthesis of rare-earth elements and yttrium with di-n-butyl phosphoric acid (DBP) were investigated. Specified volumes of a  $Y(NO_3)_3$  solution of constant concentration were mixed with equal volumes of DBP in  $CCl_4$  for 10 - 15 min, and the residual Y was determined as oxalate in the aqueous phase.  $YA_3$  formed if there was no DBP excess. Where there was excess DBP or  $Nd(NO_3)_3$  the precipitates were washed out and analyzed with oxalate or  $Y(NO_3)_3$ . The analyses of the dried precipitates revealed  $MA_3$  compounds in all cases. Lanthanide compounds in DBP are well soluble in organic substances containing DBP.  $YbA_3$  in  $CCl_4$  dissolves to  $1 \cdot 10^{-7}$  mole/liter, and in 1 mole of a DBP solution in  $CCl_4$  to  $4 \cdot 5 \cdot 10^{-2}$  mole/liter according to  $MA_3 + nH_2A_2 \rightleftharpoons MA_3 (HA)_{2n}$ .  
Card 1/3

Compounds of rare-earth...

S/078/62/007/003/014/019  
B110/B138

1.0 mole/liter, the following values were found for the  $M(HA_2)_3$  complexes of Pr, Nd, and Yb:  $\log K = 15.0$ ;  $15.4 \pm 0.2$ ;  $18.6 \pm 0.4$ . These values fitted those of europium:  $\log K = 16.8$ . DBP forms stable compounds with rare-earth ions. However, the complexes forming with excess of DBP are not stable. There are 2 figures, 5 tables, and 18 references: 4 Soviet and 14 non-Soviet. The four most recent references to English-language publications read as follows: D. F. Peppard et al. Inorg. Nucl. Chem., 4, 334 (1957); G. Duykaerts et al. J. Inorg. Nucl. Chem. 13, 332 (1960); C. F. Baes et al. J. Phys. Chem., 62, 129 (1958); T. V. Healy et al. J. Inorg. Nucl. Chem., 10, 128 (1959).

SUBMITTED: March 15, 1961

Card 3/3

SHEKA, Z.A.; KRISS, Ye.Ye.

Stability of cation nitrate complexes of neodymium and ytterbium.  
Radiokhimiia 4 no.6:720-725 '62. . (MIRA 16:1)  
(Neodymium nitrate) (Ytterbium nitrate) (Complex compounds)

SHEKA, Z.A.; SINYAVSKAYA, E.I.

Complexometric determination of rare earths in the presence  
of dialkyl phosphoric acids. Zhur.anal.khim. 18 no.4:460-462  
Ap '63. (MIRA 16:6)

1. Institute of General and Inorganic Chemistry, Academy of  
Sciences, Ukrainian S.S.R., Kiev.  
(Rare earths—Analysis) (Complexons) (Phosphoric acid)

L 14023-63

EWI(q)/EWI(m)/BDS

AFFTC/ASD/ESD-3

RM/JD/JG

ACCESSION NR: AT3002324

S/2928/62/000/003/0029/0096

610

AUTHORS: Sheka, Z. A.; Kriss, Ye. Ye.

TITLE: Extraction of rare-earth elements and complex formation processes resulting thereby

SOURCE: AN UkrRSR. Instytut zahal'noyi ta neorhanichnoyi khimiyi.  
Raboty po khimii rastvorov i kompleksnykh soyedineniy, no. 3, 1962.  
Khimiya rastvorov redkozemel'nykh elementov, 29-96.

TOPIC TAGS: rare-earth element, fission product, lantanoid, alcohol, ether, tributylphosphate, dialkylphosphoric acid, synergistic action

ABSTRACT: In the technology of nuclear materials, extraction is used extensively for precipitating and separating fission products and for purifying rare-earth elements (REE). Complex formation is treated extensively in this study on REE extraction, its dependence on the properties of the extractant and of additives, on stability of complexes formed, on concentration and components in aqueous and non-aqueous phases and on the atomic number of the lantanoids. Although a universal method for separation of all the REE has not been

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L 14023-63

ACCESSION NR: AT3002324

developed, extractive methods for individual compounds and pairs of closely-related lanthanoids have been plant-tested. An extensive analysis of data from literature and original work is presented. This analysis includes:

- (a) extraction with neutral extractants (alcohols and ethers);
- (b) extraction with organic acids (chelating agents);
- (c) compounds with organic cations (basic extractants);
- (d) extraction of lanthanoids with tributyl phosphate (TBP)
- (e) extraction of lanthanoids with dialkylphosphoric acid;
- (f) extraction of REE with other organophosphorus compounds.

Phosphonates, phosphinates, phosphine oxides, and phosphoric acid derivatives having different branched chains in the radical have been reported effective in extracting REE, but only little work has been done. Recent work on REE extraction with alkylphosphoric acid noted synergistic action of neutral organophosphorous reagents whose synergism intensified with increasing basicity of the phosphoryl oxygen:  $(RO)_3PO < R(RO)_2PO < R_2(RO)PO < R_3PO$ . In extracting U, e.g., the n-butyl derivative of these phosphoric acids increased the distribution coefficient of dialkylphosphoric acids 4, 12, 25, and 50 times, respectively. Synergistic mixtures have not been found yet for all

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L 114023-63

ACCESSION NR: AT3002324

REE; in still unpublished work on the use of amines for REE extraction, this question is important.

ASSOCIATION: none

SUBMITTED: 00

SUB CODE: NS, CH, MA

DATE ACQ: 25May63

NO REF SOV: 060

ENCL: 00

OTHER: 109

Card 3/3



L 17433-63

EPF(n)-2/EWP(q)/EWT(m)/BDS

AFFTC/ASD/SSD

Pu-4

WW/JD/JG

ACCESSION NR: AP3004354

3/0078/63/008/008/1980/1986

AUTHORS: Sheka, Z. A., Sinyavskaya, E. I.

TITLE: Extraction of rare earth elements and thorium from solutions in sulfuric acid with di-iso-butylphosphoric acid

SOURCE: Zhurnal neorganicheskoy khimii, v. 8, no. 8, 1963, 1980-1986

TOPIC TAGS: rare earth element, thorium, extraction butylphosphoric acid, sulfuric acid

ABSTRACT: The extraction of rare earth elements (R. E. E.) and thorium from sulfuric acid solutions with a 0.148 M solution of di-iso-butylphosphoric acid in kerosene has been studied. The R. E. E. and thorium was extracted from aqueous solutions containing the same amounts of the studied materials but with varying sulfuric acid concentration from 0.01 to 8.5 mole/liter. The volume of di-iso-butylphosphoric acid was also kept constant. Results of extraction show that R. E. E. and thorium are fully extracted with di-iso-butylphosphoric acid in kerosene only at a certain concentration of  $H_2SO_4$ . With an increase of  $H_2SO_4$  concentration, the percent of extracted elements sharply decreases. Yttrium

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L 17433-63

ACCESSION NR: AP3004354

is extracted at lower concentration of  $H_2SO_4$  (1.5 - 2.0 N) and thorium is extracted at the highest  $H_2SO_4$  concentration (6 N). Holmium and erbium are extracted with 2 N  $H_2SO_4$  solution. With an increase of the atomic number of an element, the concentration of  $H_2SO_4$  at which this element can be extracted with di-iso-butylphosphoric acid also increases. Extractability of dibutylphosphates of R. E. E. and thorium depends on their solubility in  $H_2SO_4$  and also their stability. The comparison of stabilities is shown by the equilibrium constants of the reaction of di-iso-butylphosphoric acid with R. E. E. and thorium. Orig. art. has: 4 tables, 2 figures and 13 equations.

ASSOCIATION: none

SUBMITTED: 03Jul62

DATE ACQ: 21Aug63

ENCL: 00

SUB CODE: CH

NO REF SOV: 003

OTHER: 006

Card 2/2

L 16598-63

EWP(q)/EWT(m)/BDS AFFTC/ASD

JD/JG

S/075/63/018/004/006/015

56

AUTHOR: Sheka, Z. A. and Sinyavskaya, E. I.

TITLE: Complexonometric determination of rare-earth elements in the presence of dialkylphosphoric acids

PERIODICAL: Zhurnal analiticheskoy khimii, v. 18, no. 4, April 1963, 460-462

TEXT: The authors establish the possibility of determining lanthanum and other rare-earth elements in their compounds with dialkylorthophosphoric acids by complexonometric titration with xylenol orange. There are 2 figures and 2 tables.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN USSR, Kiev (Institute of General and Inorganic Chemistry, Academy of Sciences Ukrainian SSR)

SUBMITTED: July 9, 1962

Card 1/1

L 15798-65 EWT(m)/EWP(j)/EWP(t)/EWP(b) I(P(c)/ASD(p)-3 JD/JG/RM  
 ACCESSION NR: AP4043581 8/0078/64/009/008/1974/1979

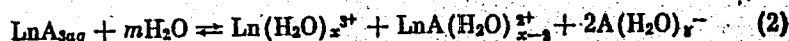
AUTHOR: Sheka, Z. A.; Sinyavskaya, E. I.

TITLE: The solubility of rare earth element dialkylphosphates in water

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 8, 1964, 1974-1979

TOPIC TAGS: rare earth dialkylphosphate, water solubility, rare earth dibutylphosphate, lanthanum dimethylphosphate, lanthanum dipropylphosphate, lanthanum dibutylphosphate, lanthanum diamylphosphate, thermodynamic characteristic

ABSTRACT: The solubility of the rare earth dibutylphosphates and of lanthanum dimethyl-, dipropyl-, dibutyl- and diamylphosphates in water was determined. The solution process is described in the following equations which show formation of  $\text{LnA}^{2+}$  complexes in addition to  $\text{Ln}^{3+}$  ions in aqueous solutions:



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L 15798-65

ACCESSION NR: AP4043581

As the length of the hydrocarbon chain in the lanthanum dialkylphosphate increased the solubility of the compounds in water decreased: with each  $-CH_2$  group the log of the solubility decreased by about 0.15, corresponding to a change in free energy of solvation of 0.2 kcal for each  $-CH_2$ . The solubility decreased with atomic number of the rare earth element; the noncontinuous change in the solubility of the rare earth dimethyl- and dibutylphosphates was explained as caused by the effect of the ligand field on the energy levels of the unfilled f-shells. The dissolution of the rare earth dialkylphosphates is an exothermic reaction, hence solubility decreased with increase in temperature. The thermodynamic characteristics (free energy, heat capacity, entropy, activity of the saturated solutions) of Tb, Dy, Er, and Yb dimethylphosphates and of La, Nd, Gd and Yb dibutylphosphates were determined. The entropy of solution increased in the rare earth element series from La to Lu and also in going from dimethyl- to dibutylphosphate. Orig. art. has: 10 equations and 2 figures.

ASSOCIATION: None

SUBMITTED: 03Jun63

ENCL: 00

Card 2/3

L 15798-65  
ACCESSION NR: AP4043581

SUB CODE: IC, GC

NO REF SOV: 006

OTHER: 010

Card 3/3

L 16315-65 EWT(m)/EWP(t)/EWP(b) IJP(c)/AFWL JD/JG  
ACCESSION NR: AP4044813 S/0078/64/009/009/2244/2250

AUTHOR: Sheka, Z. A.; Sinyavskaya, E. I. B

TITLE: Solubility of lanthanum dibutylphosphate in sulfuric and nitric acids

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 9, 1964, 2244-2250

TOPIC TAGS: solvent extraction, lanthanum dibutylphosphate, solubility, sulfuric acid, nitric acid, rare earth element extraction, dialkylphosphoric acid extraction, lanthanum dibutylphosphate ion

ABSTRACT: The solubility of lanthanum dibutylphosphate in  $H_2SO_4$  and  $HNO_3$  was determined to obtain data required for the processes of dialkylphosphoric acid extraction of the rare earth elements. As the nitric and sulfuric acid concentrations increased, the solubility of the lanthanum dibutylphosphate therein increased slowly at first, and then much more rapidly, forming a marked inflection point in the curve at concentrations slightly above 0.2N. At low hydrogen ion concentrations the following reaction occurred:  $LaA_3_{solid} + 2H^+ \rightleftharpoons LaA^{2+} +$

Card 1/2

L 16315-65

ACCESSION NR: AP4044813

2HA solution, where (HA = H(C<sub>4</sub>H<sub>9</sub>O)<sub>2</sub>PO<sub>2</sub>). At high hydrogen ion concentrations the LaA<sup>2+</sup> complex dissociated:  $\text{LaA}_3 \text{ solid} + 3\text{H}^+ \rightleftharpoons \text{La}^{3+} + 3\text{HA}$ , or, if the amount of dibutylphosphoric acid formed exceeds its solubility, it formed a separate phase:  $\text{LaA}_3 \text{ solid} + 3\text{H}^+ \rightleftharpoons \text{La}^{3+} + 3\text{HA}_{\text{sep}}$ . The break in the uniform increase in solubility was explained by the formation of this separated third phase, free dibutylphosphoric acid. The high solubility of the lanthanum dibutylphosphate in H<sub>2</sub>SO<sub>4</sub> was explained due to the possible formation of complexes of the type LaAHSO<sup>+</sup>. The stability constant of the complex ion LaA<sup>2+</sup> and the solubility product of the compound LaA<sub>3</sub> were determined from data on solubility in nitric, sulfuric and dibutylphosphoric acids, in water and in La(NO<sub>3</sub>)<sub>3</sub>:  $\text{p}K_{\text{LaA}^{2+}} = 1.78 \pm 0.06$  and  $-\lg SP_{\text{LaA}_3} = 9.5 \pm 0.3$ . Orig. art. has: 20 equations and 1 figure.

ASSOCIATION: None

SUBMITTED: 04Jun63

ENCL: 00

SUB CODE: GC

NO REF SOV: 006

OTHER: 005

Card 2/2



L 17374-66 EWP(j)/EWT(m)/ETC(f)/EWG(m)/T/EWP(t) IJP(c) RDW/RM/JD  
ACC NR: AP6004506 SOURCE CODE: UR/0186/65/007/005/0596/0603

AUTHOR: Sheka, Z. A.; Sinyavskaya, E. I.

ORG: none

TITLE: Investigation of dialkylphosphate complexes of thorium and rare earth elements by a kinetic method

SOURCE: Radiokhimiya, v. 7, no. 5, 1965, 596-603

TOPIC TAGS: organic phosphorus compound, thorium, thorium compound, rare earth element, complex molecule, colorimetric analysis, chemical stability, oxidation kinetics

ABSTRACT: The formation and stability of dibutylphosphate complexes of thorium and rare earth elements was investigated. The structure and stability of these complexes were derived from studying the kinetics of oxidation of potassium iodide catalyzed by thorium and rare earth elements. In all experiments the total volume was 25 ml. In the experiments with thorium, 5 ml of 0.2 molar acetate buffer were added to an aqueous solution of thorium chloride. This was succeeded by a solution of dibutylphosphoric acid, potassium iodide, and starch. After the introduction of

Card 1/2

UDC: 541.49 : 546.841+546.65 : 661.72

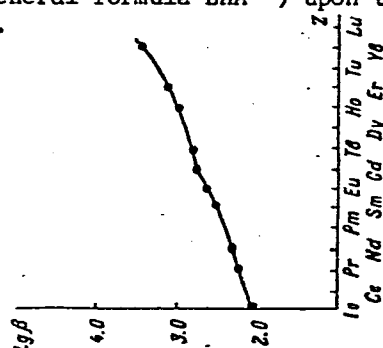
L 17374-66

ACC NR: AP6004506

hydrogen peroxide, the mixture was held at  $25 \pm 0.01^\circ\text{C}$  and the optical density of the solution was measured using a FEK-M photoelectrocolorimeter. The final concentration of potassium iodide was  $4 \cdot 10^{-4}$  molar and of hydrogen peroxide was  $3.4 \cdot 10^{-4}$  molar. It was found that n-dibutylorthophosphoric acid (HA) reacts with thorium chloride to form a complex of a general formula:  $\text{ThOHA}^{2+}$ . This complex is inactive as a catalyst for oxidation of potassium iodide by hydrogen peroxide. The logarithm of the stability constant of this complex at a zero ionic strength is equal to  $5.06 \pm 0.06$ . The dependence of the logarithm of stability constants ( $\lg \beta$ ) of complexes of rare earth elements with dibutylphosphoric acid (general formula  $\text{LnA}^{2+}$ ) upon the specific atomic number of elements is shown in fig. 1.

Orig. art. has: 2 figures, 4 tables, 13 formulas.

Fig. 1.



SUB CODE: 07/  
Card 2/2 nst

SUBM DATE: 30Sep64/

ORIG REF: 007/

OTH REF: 002

SHEKA, Z.A.; SINIAVSKAYA, E.I.

Solubility of lanthanum dibutyl phosphate in solutions of  
sodium and lanthanum nitrates. Zhur. neorg. khim. 10  
no.1:259-264 Ja '65. (MIRA 18:11)

1. Submitted May 3, 1963.

SHEPA, B.A.; SINIAVSKAYA, E.I.

Stability constants of lanthanum complexes with dibutyl-  
phosphoric acid. Zhur. neorg. khim. 10 no.2:394-397 F '65.  
(MIRA 18:11)

1. Submitted July 1, 1963.

SHKALIN, P.F., tekhn.

Combination protective shield for electric welders. Svar. proizv.  
no.10:39 0 '63. (MIRA 16:11)

1. Kulebaskiy metallurgicheskiy zavod imeni S.M.Kirova.

SHEKALOV, A.A.; SHTREYS, Ya.I.; FOGEL', A.A., kandidat tekhnicheskikh nauk, redaktor; BLINOV, B.V., inzhener, retsenzent; SOKOLOVA, I.V., tekhnicheskii redaktor.

[Smelting in coreless-type induction furnaces] Plavka v besserdechnikovyykh induktsionnykh pechakh. Pod red. A.A.Fogelia. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry, 1954. 29 p. (Bibliotekha vysokochastotnika-termista, no.14) (MIRA 7:11) (Induction heating) (Smelting)

SHEKALOV, A. A.

"Investigation of High-Coercivity Fe-Ni-Al Alloys With an Admixture of Copper."  
Cand Tech Sci, Leningrad Polytechnic Inst imeni M. I. Kalinin, Ministry of Higher  
Education, Leningrad, 1954. (KL, No 2, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher  
Educational Institutions (12)  
SO: Sum. No. 556, 24 Jun 55

*SHEKALOV, A. A.*

USSR/ Metallurgy - Thermomagnetic treatment

FD-1047

Card 1/1 : Pub. 153 - 16/23

Authors : Golovin, G. F., and Shekalov, A. A.

Title : Temperature of annealing in the thermo-magnetic treatment of the alloy magniko

Periodical : Zhur. tekhn. fiz., 24, 1503-1507, Aug 1954

Abstract : Conclude that thermomagnetic treatment in the temperature range 1000-1250°C cannot ensure the needed properties, which points to the erroneousness of Ya. M. Dovgalevskiy's viewpoint (ZhTF, 22, No 1, 1952). Properties closest to the maximum are ensured by thermomagnetic treatment of the alloy with annealing up to 1300°C, when a homogeneous solid solution is again formed. Four references, 3 USSR e.g. G. F. Golovin, et al. Tekhninformatsiya [Technical Information], Card No 205/15-206/16, 1950).

Institution : --

Submitted : 23 November 1953



Call Nr: AF 1140766

AUTHOR: Shekalov, A.A., Shtreys, Ya.I., Blinov, B.V.

TITLE: Melting in Small Coreless-Induction Furnaces  
(Plavka v malykh besserdechnikovykh induktsionnykh  
pechakh)

PUB. DATA: Gosudarstvennoye nauchno-tekhnicheskoye izdatel'stvo  
mashinostroitel'noy literatury; Moscow-Leningrad,  
1957 (2-nd edition), 53 pp. 10,000 copies.

ORIG. AGENCY: Leningrad Division of Mashgiz (State Scientific and  
Technical Publishing House of Literature on Machine  
Building)

EDITOR: Fogel', A.A., Candidate of Techn. Sc.; Reviewer: Don-  
skoy, A.V., Professor, Doctor of Techn. Sc.;  
Editorial Staff: Fogel', A.A., Candidate of Techn.Sc.,

Card 1/4

Call Nr: AF 1140766

Melting in Small Coreless-Induction Furnaces (Cont.)

Chief Editor of 2nd ed.; Spitsyn, M.A., Candidate of Techn. Sc.; Slukhotskiy, A.Ye., Candidate of Techn.Sc.; Glukhanov, N.P., Candidate of Techn.Sc.; Bamuner, A.V., Eng., Editor of the Leningrad Division of Mashgiz: Bol'shakov, M.A., Eng.; Editor-in-Chief of the State Scientific and Technical Publishing House of Literature on Machine Building: Simonovskiy, N.Z.; Tech. Ed.: Sycheva, O.V.; Proofreader: Khoroshkevich, V.M.

PURPOSE:

The present brochure is one of the "Pocket Library of the High-Frequency Furnace Operator" ("Bibliotekha vysokochastotnika-termista) series publications. The purpose of this series is to present the latest achievements in the field of high-frequency practice, the scientific findings of the High-Frequency Power Institute (Institut tokov vysokoy chastoty) im. Professor V.P. Vologdin, and the practical findings gathered in this field of technology in the Soviet Union and abroad, in order to further the wide introduction of high-frequency melting methods and advanced metallurgical production methods. The brochures are written for the rank and file workers of the metallurgical industry.

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Melting in Small Coreless-Induction Furnaces (Cont.)

COVERAGE: The authors explain the basic principles of the coreless-induction furnace melting practices with access of air, in a vacuum, and in various protective media. They describe the construction of various melting furnaces, the preparation of the crucible, and different melting methods. Some of the data refer to the smelting furnaces which have been developed jointly by the "Elektrik" Plant and the laboratory of Professor V.P. Vologdin, a Soviet pioneer in the field of induction melting. These furnaces range in capacity from 10—3,000 kg. They have been installed at many Soviet industrial plants by the "Elektroprom" Organization. The authors list no bibliographical references.

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Melting in Small Coreless-Induction Furnaces (Cont.)

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GOLOVIN, G.F., kandidat tekhnicheskikh nauk; RYSKIN, S.Ye.; SHEKALOV, A.A.,  
kandidat tekhnicheskikh nauk.

Centrifugal lining of bimetallic bushings with lead bronze. Avt. i  
trakt. prom. no.5:44-46 My '57. (MLRA 10:6)

1. Nauchno-issledovatel'skiy institut tokov vysokoy chastoty.  
(Bearings (Machinery)) (Lead bronze)

*Shekalov, A.A.*

113-58-3-10/16

AUTHOR: Shekalov, A.A., Candidate of Technical Sciences

TITLE: Induction Heating of Permanent Magnets Made From Iron-Nickel-Aluminum Alloys (Induktsionnyy nagrev postoyannykh magnitov iz zhelezonikel'alyuminiyevykh splavov)

PERIODICAL: Avtomobil'naya Promyshlennost', 1958, Nr 3, pp 31-32 (USSR)

ABSTRACT: There are two industrial methods for the manufacture of permanent magnets. According to the most simple method, the magnets are cast and immediately processed. In the other method, the forged pieces are cooled and after a second heating, receive their final machining. The second method permits the production of magnets with the same properties throughout the whole series. The drawbacks are: additional work, equipment, loss by slag formation which amounts to 3-4%, etc. In the article, induction heating of magnets is proposed, instead of the heating in electrical or flame furnaces. The induction applied is strong enough to heat the magnet throughout. Magnets 20 mm in diameter or less are heated by radio-frequency, from 15-40 mm by 8,000 - 10,000 cycles, from 30 - 80 mm by 2,500 cycles. Investigations were carried out on specimens of 4 different alloys 50 mm

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113-58-3-10/16

Induction Heating of Permanent Magnets Made From Iron-Nickel-Aluminum Alloys

long and 20 mm in diameter. Heating temperature and cooling speed of the different alloys are cited in the table. The inductor used for heating was a multi-coil apparatus fed by a generator of 100 kw and 8,000 cycles. Figure 2 shows that all alloys at a heating speed of 25 - 130° per sec have nearly the same magnetic properties. The induction method of heating was tested on star-type runners of two different alloys (Figure 4). The test device is shown in Figure 5. The length of its inductor is 600 mm, its inner diameter 130 mm. Every 30 sec, a heated magnet left the apparatus. Induction heating increases the productivity of the thermal workshops. For magnets of complex form, special devices are needed.

There are 5 figures and 1 table.

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Card 2/2      1. Magnets-Heat treatment      2. Magnets-Production      3. Induction heating-Applications

Shekalov, A.A.

129-4-6/12

AUTHORS: Shekalov, A.A., Candidate of Technical Sciences, and  
Shtreys, Ya. I., Engineer.

TITLE: Investigation of the mechanical and the magnetic  
properties of Fe-Ni-Al alloys intended for permanent  
magnets. (Issledovaniye mekhanicheskikh i magnitnykh  
svoystv Fe-Ni-Al splavov dlya postoyannykh magnitov).

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, No.4,  
pp. 29-38 (USSR).

ABSTRACT: Relatively little attention has been paid up to now to  
studying the mechanical properties of Fe-Ni-Al alloys.  
Published information relates to a small number of  
compositions and, therefore, does not bring out fully  
the changes in the mechanical properties brought about  
by the differing compositions used for manufacturing  
permanent magnets. The authors of this paper studied  
systematically the mechanical properties of the ternary  
system Fe-Ni-Al alloys and of quaternary alloys with  
copper. Furthermore, they investigated the influence  
of admixtures of sulphur, titanium and lithium on the  
mechanical and magnetic properties of these alloys.  
For the investigations alloys of 21 compositions were  
chosen with concentrations corresponding to those used

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129-4-6/12

Investigation of the mechanical and the magnetic properties of Fe-Ni-Al alloys intended for permanent magnets.

1. Nickel improves the strength of Fe-Ni-Al alloys and also the impact strength in the as cast and in the hardened states. An increase in the aluminium content brings about a reduction of the strength and the impact strength of the alloys.
2. Introduction of up to 6% copper reduces the bending and torsion strength but increases the impact strength of the alloy; with higher copper contents the effect of copper seems to change into the opposite direction. An increase in the copper content above 6% involves practically no change in the torsion strength.
3. Variation of the contents of Ni, Al and Cu does not solve the problem of obtaining alloys with a satisfactory combination of magnetic and mechanical properties; for obtaining optimum magnetic properties of alloys with good mechanical properties it is necessary to apply high heating temperatures and rapid cooling which may lead to crack formation and higher reject percentages.
4. Sulphur increases the bending and torsion strength and improves greatly the grinding properties of Fe-Ni-Al alloys; the highest impact strength is obtained for

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129-4-6/12

Investigation of the mechanical and the magnetic properties of Fe-Ni-Al alloys intended for permanent magnets.

produced Fe-Ni-Al alloys requires further study.

7. Torsion is a reliable method of mechanical testing of Fe-Ni-Al alloys since in this case the scattering of results is lowest.

There are 12 figures, 3 tables and 4 references - 3 Russian, 1 English.

ASSOCIATION: Scientific Research Institute of High-frequency Current  
imeni V. P. Vologdin  
(NII t.v.ch. imeni V. P. Vologdina).

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Card 5/5

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67283

SOV/180-59-4-15/48

AUTHOR: Shekalov, A.A. (Leningrad)

TITLE: Investigation of the Mechanical and Magnetic Properties of Iron-Nickel-Aluminium Alloys<sup>1</sup> for Permanent Magnets<sup>2</sup>

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 4, pp 88-98 (USSR)

ABSTRACT: The author points out that the mechanical properties of iron-nickel-aluminium base permanent magnetic alloys<sup>3</sup> have not received as much attention as have their magnetic properties. This deficiency of information may be delaying their wider application; alloying additions capable of improving mechanical without affecting magnetic properties may exist. The object of the present investigation was the study of the mechanical properties of iron-nickel-aluminium and iron-nickel-aluminium-copper alloys and the effect of additions of sulphur, titanium (0 to 2.0%) and lithium on the mechanical and magnetic properties. Alloy compositions were chosen to be close to those used in practice and to have definite constant Ni:Al ratios. The total ranges of contents (wt %) of the main elements are: 48.0 to 89.0 Fe, 4.5 to 31.0 Ni, 3.4 to 16.0 Al, 0 to 12.0 Cu. Table 2 gives alloy

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Investigation of the Mechanical and Magnetic Properties of  
Iron-Nickel-Aluminium Alloys for Permanent Magnets

mechanical and magnetic properties; but addition of 0.2% sulphur does. Titanium additions should be made to cobalt-containing (type ANKo-1 and ANKo-4) alloys to obtain alloys with different combinations of coercive force and remanence. For ANKo-4 alloys the preliminary data suggest that lithium additions improve the strength and also (slightly) the magnetic properties, 0.05% Li giving the best combination of mechanical and magnetic properties. The author found considerable scatter of mechanical-test results on Fe-Ni-Al alloys, he recommends torsion tests, which gave the most reproducible results. There are 16 figures, 3 tables and 4 references, 3 of which are Soviet and 1 English.

SUBMITTED: April 1, 1959

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